Lat 41.16752 Lon -123.21586

United States Department Of Agriculture | Forest Service | Shasta-Trinity National Forests

Reply To: 3420 Date: December 29, 1989

Subject: Biological Evaluation of Pest Conditions and Tree Mortality in Stand 46, Compartment 436, Salmon River RD (Rept. No. N89-25)

To: Forest Supervisor, Klamath National Forest

On October 17, 1989, Dave Schultz, entomologist, and I met with Barbara Busse, silviculturist, to examine stand 46, compartment 436 (T. 28 N., R. 12 W., section 24) on Salmon River Ranger District. The management objectives for this stand are wildlife habitat maintenance and enhancement and, secondarily, timber production.

The stand contains ponderosa pine, Douglas-fir, and black oak. Two plant aggregations exist, both with 2 layers. The aggregations differ in the amount of crown cover and species composition between the 2 layers. In aggregation 1, the top layer is open and contains equal proportions of pine and Douglas-fir. The lower layer is dense with a large proportion of Douglas-fir. In aggregation 2, the canopy is nearly closed with a large component of ponderosa pine. Douglas-fir is the primary species in the lower layer. Black oaks with large spreading crowns are present in the lower layer of both aggregations.

Two group kills of ponderosa pine were present in the stand. One was southeast of a meadow and most of the mortality was at least a year old. Overstocking, drought, and bark beetles appeared to be the cause. The other group was north of the meadow and involved about 20 ponderosa pines. Mortality had occurred in 1988 and 1989. Stocking in this area prior to the mortality measured 400 sq. ft./ac. Western pine beetle (Dendroctonus brevicomis) and red turpentine beetle (D. valens) galleries and pitch tubes were found on these trees. Disease agents were not involved in this mortality, although low levels of western dwarf mistletoe (Arceuthobium campylopodum) were observed in some of the trees. Mortality was attributed to the successful attack of weakened trees by bark beetles, followed by the attraction of additional beetles to the area by pheromones produced in the initial attacks.

Western dwarf mistletoe was scattered in the ponderosa pine in the top layer of the stand. The level of infection in the stand was low, but some trees were moderately infected and had developed witches' brooms.

The prescription for this stand includes a thinning of the conifer overstory to expose and release some of the larger oaks, and to remove suppressed and sanitation trees. In 20 years, the overstory will have a seed tree cut to achieve stand replacement. The seed trees will not be removed, but will be retained for snag recruitment and stand diversity. Also, any advanced conifer regeneration in good condition will be saved.

MANAGEMENT ALTERNATIVES

1) No Action. Leaving this stand in its present condition will result in periodic mortality of groups of trees, especially ponderosa pines in dense aggregations. Also, as dwarf mistletoe intensifies in individual trees, they will become improved habitat for bark beetles and could act as foci for initial attacks, with subsequent insect attacks on nearby surrounding pines. Trees in layer 2, aggregation 2 will be suppressed. There will also be some suppression in aggregation 1. When small openings in the canopy develop, increased pine regeneration can be expected. If overstory pines surrounding these openings are infected by dwarf mistletoe, they will infect this regeneration, resulting in its stagnation and deformation. If Douglas-fir is already established in these openings, it may respond to the release and subsequent pine regeneration will be minimal. Many of the large oaks in aggregation 2 will slowly decline and die from suppression. The long-term outlook for this stand is conversion to a stand with a heavy component of Douglas-fir and some scattered, large ponderosa pines. The Douglas-firs will be smaller and more densely stocked than the existing stand, with many suppressed trees. The oak component will be reduced to a few scattered, suppressed individual trees.

2) Implement Proposed Prescription. The proposed prescription will achieve many of the stated goals. The one factor that will interfere with long-term health of the stand is the presence of western dwarf mistletoe in the overstory ponderosa pine. When the seed tree cut is performed in year 20, some of the seed trees likely will have some infections. Even with the closest scrutiny during seed tree selection, some infected trees will be missed. If the seed trees were harvested, felled, or successfully girdled within 10 years, then the mistletoe concern would be reduced. Leaving these trees will result in infection of pine regeneration in the stand. Because of the continuous infection, this regeneration will be stunted and deformed. The result will be that in some areas of the stand, Douglas-fir will predominate with infected, suppressed pines providing competition, but not adding to the future merchantable volume.

3) Implement a Modified Prescription. The primary modification to the proposed prescription would be to kill the pine seed trees within 10 years of the seed tree cut. These trees do not need to be removed. Once the trees die, so does the dwarf mistletoe and it no longer is capable of being infective. Several options exist to deal with the seed trees and a combination of these may be most appropriate. Harvesting is one option. Economics and damage to the regenerated stand may detract from this option. Girdling is feasible. Trees often take several years to die following girdling, so this needs to be taken into account when girdling is scheduled. Waiting until year 10 to girdle the trees may mean that they are still producing dwarf mistletoe seed 14-15 years after the seed tree cut. If trees are girdled, they will need to be examined within several years to make sure they have died or to determine if additional treatment is necessary. Girdling will provide snags for a number of years. Finally, the trees could be felled and left where they lay. Some damage to the stand will occur, but it can be minimized. The downed logs will provide additional wildlife habitat.

Two insect pests could cause problems in alternatives 2 or 3 if activities are not properly planned and implemented. These are bark beetles and engraver beetles. When pines are girdled, they become more susceptible to attack by bark beetles. This could create a problem if there are nearby pines (within about a 20 foot radius) that are larger than 4 inches dbh and that need to be retained. These girdled trees may be attacked by bark beetles that attract additional beetles to the area. These arriving beetles may attack pines in the immediate vicinity, not necessarily the tree that has already been attacked. In this situation, it would be advisable to fell the tree rather than girdle it. Engraver beetles can buildup and cause localized mortality if large quantities of green pine slash are produced and not treated properly. When trees are felled, they should be limbed and the unutilized portion of the bole and limbs larger than 3 inches diameter cut into pieces less than 18 inches long. The limbs should be scattered, not piled, and should not be left shading the bole. Felling activity between mid-July and December will further reduce the chance for engraver beetle buildup and subsequent damage to leave trees.

We are available to you for evaluations of pest conditions in other areas as you require. If there are questions about this evaluation or you want additional FPM assistance, please contact Dave Schultz or me at the Shasta-Trinity SO (916-246-5101).

Gregg DeNitto

GREGG DeNITTO
FPM Northern CA Service Area